

WHAT IS CLAIMED IS:

1. A polymer gel composition comprising:

a swelling liquid; and

a polymer gel which has the characteristic of absorbing and releasing the swelling liquid due to a change in temperature so as to reversibly change a volume of the polymer gel, and includes a crosslinked polymer having at least a hydrogen bonding group,

wherein the crosslinked polymer included in the polymer gel is a copolymer of at least two monomer components including;

(meth)acrylamide or a mono-substituted derivative thereof as a monomer component (A); and

a monomer different from the monomer component (A) as a monomer component (B).

2. A polymer gel composition according to claim 1, wherein the monomer component (A) is (meth)acrylamide, and the monomer component (B) is selected from the group consisting of a mono-substituted (meth)acrylamide, a di-substituted (meth)acrylamide, a (meth)acrylate derivative and a vinyl type monomer.

3. A polymer gel composition according to claim 1, wherein the monomer component (A) is (meth)acrylamide, and the monomer component (B) is selected from the group consisting of a

mono-substituted (meth)acrylamide, a di-substituted (meth)acrylamide, and a (meth)acrylate derivative.

4. A polymer gel composition according to claim 1, wherein the monomer component (A) is a mono-substituted derivative of (meth)acrylamide, and the monomer component (B) is selected from the group consisting of (meth)acrylamide, a di-substituted (meth)acrylamide, a (meth)acrylate derivative, and a vinyl type monomer.

5. A polymer gel composition according to claim 1, wherein the monomer component (A) is a mono-substituted derivative of (meth)acrylamide, and the monomer component (B) is selected from a group consisting of (meth)acrylamide, a di-substituted (meth)acrylamide, and a (meth)acrylate derivative.

6. A polymer gel composition according to claim 1, wherein a pH value of the swelling liquid is from 2 to 7.

7. A polymer gel composition according to claim 1, wherein the swelling liquid includes at least a water-soluble organic compound.

8. A polymer gel composition according to claim 7, wherein the water-soluble organic compound is an alcohol.

9. A polymer gel composition according to claim 1, wherein the swelling liquid includes at least an acidic compound.

10. A polymer gel composition according to claim 9, wherein the acidic compound is a polymer having a carboxyl group.

11. A polymer gel composition according to claim 1, wherein the polymer gel is an IPN material including at least polymers which form hydrogen bonds with each other.

12. A polymer gel composition according to claim 11, wherein the IPN material comprises the crosslinked polymer having at least a hydrogen bonding group, and a crosslinked polymer having at least a carboxylic group or a partially neutralized crosslinked polymer of the crosslinked polymer having at least a carboxylic group.

13. A polymer gel composition according to claim 1, wherein the swelling liquid includes at least an alcohol, and the polymer gel is an IPN material comprising the crosslinked polymer having at least a hydrogen bonding group, and a crosslinked polymer having at least a carboxylic group or a partially neutralized crosslinked polymer of the crosslinked polymer having at least a carboxylic group.

14. A polymer gel composition according to claim 1, wherein the swelling liquid includes a polymer having at least a carboxyl group, and the polymer gel is an IPN material comprising the crosslinked polymer having at least a hydrogen bonding group, and a crosslinked polymer having at least a carboxylic group or a partially neutralized crosslinked polymer of the crosslinked polymer having at least a carboxylic group.

15. A polymer gel composition according to claim 1, wherein the polymer gel contains a light-modulation material therein.

16. An optical device comprising:
a polymer gel composition comprising
 a swelling liquid, and
 a polymer gel which has the characteristic of
absorbing and releasing the swelling liquid due to a change
in temperature so as to reversibly change a volume of the
polymer gel, and includes a crosslinked polymer having at
least a hydrogen bonding group; and
a substrate sandwiching the polymer gel composition,
wherein the crosslinked polymer included in the polymer gel
is a copolymer of at least two monomer components including
 (meth)acrylamide or a mono-substituted derivative thereof
as a monomer component (A); and

a monomer different from the monomer component (A) as a monomer component (B).

17. A resin composition comprising:

a polymer gel composition comprising

a swelling liquid, and

a polymer gel which has the characteristic of absorbing and releasing the swelling liquid due to a change in temperature so as to reversibly change a volume of the polymer gel, and includes a crosslinked polymer having at least a hydrogen bonding group; and

a resin in which the polymer gel composition is dispersed, wherein the crosslinked polymer included in the polymer gel is a copolymer of at least two monomer components including

(meth)acrylamide or a mono-substituted derivative thereof as a monomer component (A); and

a monomer different from the monomer component (A) as a monomer component (B).

18. An optical film comprising:

a polymer gel composition comprising

a swelling liquid, and

a polymer gel which has the characteristic of absorbing and releasing the swelling liquid due to a change in temperature so as to reversibly change a volume of the

polymer gel, and includes a crosslinked polymer having at least a hydrogen bonding group; and
a film on which the polymer gel composition is provided, wherein the crosslinked polymer included in the polymer gel is a copolymer of at least two monomer components including (meth)acrylamide or a mono-substituted derivative thereof as a monomer component (A); and
a monomer different from the monomer component (A) as a monomer component (B).